Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Original) An atomic layer deposition (ALD) process for depositing a metal nitride layer comprised of a plurality of metal nitride monolayers on a substrate, comprising:

(a) providing a substrate with a patterned layer formed thereon;

(b) loading the substrate in an ALD process chamber and adjusting the temperature and pressure in said ALD process chamber to acceptable levels;

(c) flowing a nitrogen containing reactant into said ALD process chamber so that said nitrogen containing reactant is deposited on said substrate;

(d) purging said ALD process chamber with an inert gas to leave a monolayer of nitrogen containing reactant on said substrate;

(e) flowing a metal precursor into said ALD process chamber, said metal precursor reacts with said nitrogen containing reactant monolayer to form a metal nitride monolayer;

(f) purging said ALD process chamber to remove unreacted metal precursor; and

(g) repeating the sequence of steps (c), (d), (e), (f) until an acceptable thickness of metal nitride layer is reached.

2. (Original) The method of claim 1 wherein the temperature of said ALD process chamber is between about 250°C and 750°C and the pressure in said ALD process chamber is maintained in a range from about 0.1 to 50 Torr.

3. (Original) The method of claim 1 wherein said metal precursor is $Ti\{OCH(CH_3)_2\}_4$, tetrakis(dimethylamido)titanium (TDMAT), tetrakis(diethylamido)titanium (TDEAT), or tert-butylimino-tris(diethylamino)tantalum (TBTDET).

4. (Withdrawn) The method of claim 1 wherein said metal precursor is $TiCl_4$or $TaCl_5$.

5. (Currently Amended) The method of claim 1 wherein said metal precursor is flowed into said ALD process chamber at a rate of about 500 to 10000 standard cubic centimeters per minute (sccm) for a period of about 0.1 to 3 seconds.

6. (Original) The method of claim 1 wherein said metal precursor gas is transported into said ALD process chamber by an inert gas having a flow rate of about 500 to 10000 sccm.

7. (Original) The method of claim 1 wherein the inert gas purging of said ALD process chamber is comprised of flowing argon, helium, or N_2 with a flow rate from about 500 to 10000 sccm for a period of about 0.1 to 10 seconds.

8. (Original) The method of claim 1 wherein the nitrogen containing reactant is comprised of NH_3, N_2H_4, or N_2 and is flowed at a rate of about 500 to 10000 sccm for a period of about 0.1 to 3 seconds.

9. (Original) The method of claim 8 further comprised of a generating a plasma to assist in the reaction between the nitrogen containing reactant and the metal precursor.

10. (Original) The method of claim 1 wherein the film thickness of the metal nitride layer is between 0 and about 50 nm.

11. (Currently Amended) An atomic layer deposition (ALD) process for depositing a metal nitride layer comprised of a plurality of metal nitride monolayers on a substrate, comprising:

(a) providing a substrate with a patterned layer formed thereon;

(b) loading the substrate in an ALD process chamber and adjusting the temperature and pressure in said ALD process chamber to acceptable levels;

(c) flowing a metal precursor into said ALD process chamber so that said metal precursor is deposited on said substrate, wherein said metal precursor is $Ti\{OCH(CH_3)_2\}_4$, TDMAT, TDEAT, or TBTDET;

(d) purging said ALD process chamber with an inert gas to leave a monolayer of metal precursor on said substrate;

(e) flowing a nitrogen containing reactant into said ALD process chamber, said nitrogen containing reactant reacts with said metal precursor monolayer to form a metal nitride monolayer;

(f) purging said ALD process chamber to remove unreacted nitrogen containing reactant; and

(g) repeating the sequence of steps (c), (d), (e), (f) until an acceptable thickness of metal nitride layer is reached.

12. (Currently Amended) A method of forming a metal nitride layer on a substrate, said substrate comprised of an upper dielectric layer having at least one opening, comprising:

(a) providing a substrate having an upper dielectric layer that has a pattern formed therein comprised of at least one opening;

(b) loading the substrate in an ALD process chamber and adjusting the temperature and pressure in said ALD process chamber to acceptable levels;

(c) flowing a metal precursor into said ALD process chamber so that said metal precursor is deposited on said substrate, wherein said metal precursor is Ti{$OCH(CH_3)_2$}$_4$, TDMAT, TDEAT, or TBTDET.

(d) purging said chamber with an inert gas to leave a monolayer of metal precursor on said substrate;

(e) flowing a nitrogen containing reactant into said ALD process chamber, said nitrogen containing reactant reacts with said metal precursor monolayer to give a metal nitride monolayer on said substrate;

(f) purging said ALD process chamber to remove unreacted nitrogen containing reactant;

(g) repeating the sequence of steps (c), (d), (e), (f) to deposit a plurality of metal nitride monolayers which form a composite layer that fills said opening; and

(h) planarizing said composite layer to be coplanar with said dielectric layer.

13. (Original) The method of claim 12 wherein said dielectric layer is phosphosilicate glass (PSG), borophosphosilicate glass (BPSG), or a low k dielectric material with a thickness between about 1000 and 10000 Angstroms.

14. (Original) The method of claim 12 wherein said opening is a contact hole, via, or trench and has a width that is about 100 nm or less.

15. (Original) The method of claim 12 wherein the temperature of said ALD process chamber is between about 250°C and 750°C and the pressure in said ALD process chamber is maintained in a range from about 0.1 to 50 Torr.

16. (Cancelled).

17. (Withdrawn) The method of claim 12 wherein said metal precursor is $TiCl_4$ or $TaCl_5$.

18. (Original) The method of claim 12 wherein said metal precursor is flowed at a rate of about 500 to 10000 sccm for a period of about 0.1 to 3 seconds.

19. (Original) The method of claim 12 wherein said metal precursor is transported into the ALD process chamber by an inert gas having a flow rate of about 500 to 10000 sccm

20. (Original) The method of claim 12 wherein the inert gas purging of said ALD process chamber is comprised of flowing argon, helium, or N_2 with a flow rate from about 500 to 10000 sccm for a period of about 0.1 to 10 seconds.

21. (Original) The method of claim 12 wherein the nitrogen containing reactant is comprised of NH_3, N_2H_4, or N_2 and is flowed at a rate of about 500 to 10000 sccm for a period of about 0.1 to 3 seconds.

22. (Original) The method of claim 21 further comprised of a generating a plasma to assist in the reaction between the nitrogen containing reactant and the metal precursor.

23. (Original) The method of claim 12 further comprised of performing a film thickness measurement after several repetitions of the sequence of steps (c), (d), (e), (f) to determine if an acceptable thickness of said composite layer has been achieved.

24. (Original) The method of claim 12 wherein said planarization is performed with a chemical mechanical polish (CMP) step.

25. (Withdrawn) The method of claim 12 wherein the composite layer is planarized by a plasma etch process in a process chamber comprising a chamber temperature of about 20°C to 100°C, a chamber pressure from about 1 to 50 Torr, a RF power of 100 to 2000 Watts, and a gas mixture comprised of Cl_2, BCl_3, and Ar each with a flow rate of about 10 to 100 sccm for a period from about 5 to 60 seconds.

26. (Withdrawn) A method of forming an interconnect which is a composite layer comprised of a plurality of monolayers in an opening within a dielectric layer on a substrate, comprising:

(a) providing a substrate with a dielectric layer formed thereon, said dielectric layer having a pattern formed therein comprised of at least one opening;

(b) loading the substrate in an ALD process chamber and adjusting the temperature and pressure in said chamber to acceptable levels;

(c) flowing a metal precursor into said ALD process chamber so that said metal precursor is absorbed on said substrate;

(d) purging said chamber with an inert gas to leave a monolayer of metal precursor on said substrate;

(e) flowing a nitrogen containing reactant into said ALD process chamber, said nitrogen containing reactant reacts with said metal precursor monolayer to give a metal nitride monolayer on said substrate;

(f) purging said ALD process chamber to remove unreacted nitrogen containing reactant;

(g) flowing a silicon source gas or a boron source gas into said ALD process chamber, said silicon source gas or boron source gas reacts with said metal nitride monolayer to form a monolayer of MSiN or MBN where M is a metal:

(h) purging said ALD process chamber to remove the unreacted silicon source gas or the unreacted boron source gas;

(i) repeating one or more cycles a plurality of times in a predetermined order wherein a cycle is defined as a first sequence (c), (d), (e), (f), (g), (h), a second sequence (c), (d), (e), (f) that forms a MN monolayer, or a third sequence (c), (d), (g), (h) that forms a MSi or MB monolayer; said plurality of cycles forms a composite layer that fills said opening; and

(j) planarizing said composite layer to become coplanar with said dielectric layer.

27. (Withdrawn) The method of claim 26 wherein said dielectric layer is PSG, BPSG, or a low k dielectric material with a thickness between about 1000 and 10000 Angstroms.

28. (Withdrawn) The method of claim 26 wherein said opening is a contact hole, via, or trench having a width that is about 100 nm or less.

29. (Withdrawn) The method of claim 26 wherein the temperature of said ALD process chamber is between about 250°C and 750°C and the pressure in said ALD process chamber is maintained in a range from about 0.1 to 50 Torr.

30. (Withdrawn) The method of claim 26 wherein said metal precursor is $Ti\{OCH(CH_3)_2\}_4$, TDMAT, TDEAT, or TBTDET.

31. (Withdrawn) The method of claim 26 wherein said metal precursor is $TiCl_4$or $TaCl_5$.

32. (Withdrawn) The method of claim 26 wherein said metal precursor is flowed into said ALD process chamber at a rate of about 500 to 10000 sccm for a period of about 0.1 to 3 seconds.

33. (Withdrawn) The method of claim 26 wherein said metal precursor is transported into the ALD process chamber by an inert gas having a flow rate of about 500 to 10000 sccm.

34. (Withdrawn) The method of claim 26 wherein the inert gas purging of said ALD process chamber is comprised of flowing argon, helium, or N_2 with a flow rate from about 500 to 10000 sccm for a period of about 0.1 to 10 seconds.

35. (Withdrawn) The method of claim 26 wherein the nitrogen containing reactant is comprised of NH_3, N_2H_4, or N_2 and is flowed into said ALD process chamber at a rate of about 500 to 10000 sccm for a period of about 0.1 to 3 seconds.

36. (Withdrawn) The method of claim 35 further comprised of a plasma to assist in the reaction between the nitrogen containing reactant and the metal precursor.

37. (Withdrawn) The method of claim 26 wherein all cycles including a step (g) involve a silicon source gas that is comprised of SiH_4 which is flowed at a rate of about 500 to 10000 sccm for a period of about 0.1 to 3 seconds.

38. (Withdrawn) The method of claim 26 wherein all cycles including a step (g) involve a boron source gas that is comprised of B_2H_6 which is flowed at a rate of about 500 to 10000 sccm for a period of about 0.1 to 3 seconds.

39. (Withdrawn) The method of claim 26 wherein a film thickness measurement is performed after a plurality of monolayers has been formed to determine if an acceptable thickness of the composite layer has been achieved.

40. (Withdrawn) The method of claim 26 wherein an $M_VS_XN_Z$ composite layer is formed where v, x, and z are fractions between 0 and 1 and which together equal 1, M is Ta or Ti, and S is Si or B.

41. (Withdrawn) The method of claim 40 wherein v is about 0.5, x is from about 0.005 to 0.15, and z is from about 0.05 to 0.4.

42. (Withdrawn) The method of claim 40 wherein the $M_VS_XN_Z$ composite layer is comprised of a plurality of MSN monolayers.

43. (Withdrawn) The method of claim 40 wherein the $M_VS_XN_Z$ composite layer is comprised of at least one MS monolayer and at least one MN monolayer.

44. (Withdrawn) The method of claim 26 wherein said planarizing step is a CMP step.

45. (Withdrawn) The method of claim 26 wherein the composite layer is planarized by a plasma etch process comprising the following conditions: a chamber temperature of about 20°C to 100°C, a chamber pressure from about 1 to 50 Torr, a RF power of 100 to 2000 Watts, a gas mixture comprised of Cl_2, BCl_3, and Ar each with a flow rate of about 10 to 100 sccm, for a period from about 5 to 60 seconds.

46. (Withdrawn) The method of claim 26 wherein a first metal gas precursor is flowed into the chamber during one or more cycles involving step (e) and wherein a second metal gas precursor is flowed into the chamber during one or more cycles involving step (e), said first metal gas precursor and said second metal gas precursor are not introduced during the same step (e).

47. (Withdrawn) The method of claim 46 wherein a composite layer of $M_{1V}M_{2W}S_XN_Z$ is formed where M_1 is said first metal, M_2 is said second metal, S is Si or B, and v, w, x and z are fractions between 0 and 1 which together equal 1.

48. (Withdrawn) The method of claim 47 wherein M_1 is Ti, M_2 is Ta, and S is Si.

49. (Withdrawn) The method of claim 26 wherein at least one of the cycles that include a step (g) involves a silicon source gas and at least one of the cycles that include a step (g) involves a boron source gas.

50. (Withdrawn) The method of claim 49 wherein a composite layer of $M_VSi_XB_YN_Z$ is formed where M is Ti or Ta, and v, x, y, and z are fractions between 0 and 1 which together equal 1.

51. (Withdrawn) A method of forming an interconnect which is a composite layer comprised of a plurality of monolayers in an opening within a dielectric layer on a substrate, comprising:

(a) providing a substrate with a dielectric layer formed thereon, said dielectric layer having a pattern formed therein comprised of at least one opening;

(b) loading the substrate in an ALD process chamber and adjusting the temperature and pressure in said chamber to acceptable levels;

(c) flowing a nitrogen containing reactant into said ALD process chamber so that said nitrogen containing reactant is deposited on said substrate;

(d) purging said ALD process chamber with an inert gas to leave a monolayer of nitrogen containing reactant on said substrate;

(e) flowing a metal precursor into said ALD process chamber, said metal precursor reacts with the nitrogen containing reactant monolayer to give a metal nitride monolayer on said substrate;

(f) purging said ALD process chamber to remove unreacted metal precursor;

(g) flowing a silicon source gas or a boron source gas into said ALD process chamber, said silicon source gas or boron source gas reacts with said metal nitride monolayer to form a monolayer of MSiN or MBN where M is a metal:

(h) purging said ALD process chamber to remove unreacted silicon source gas or unreacted boron source gas;

(i) repeating one or more cycles a plurality of times in a predetermined order wherein a cycle is defined as a first sequence (c), (d), (e), (f), (g), (h), a second sequence (e), (f), (g), (h) that deposits a MSiN or MBN monolayer, or a third sequence (c), (d), (e), (f) that deposits a MN monolayer; said plurality of cycles form a composite layer that fills said opening; and

(j) planarizing said composite layer to become coplanar with said dielectric layer.